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ABSTRACT

Guidelines for purchasing computers and for curriculum planning are offered as a beginning for educators interested in computers. The first section includes eight steps to take in planning for a computer, a chart of a microcomputer infusion model, an article on rating the microcomputers, and guides to understanding the rating factors and computer costs. A factor weight chart is also included. A chapter on selecting software covers care and maintenance of equipment and provides Commodore PET software tips and a sample educational software evaluation. A sample computer plan from the Monrovia (California) Unified School Districts is also included. Ways to cope with having to use one computer with 30 students are described, including a role-playing activity entitled "The Human Computer." Word processing with a computer is briefly explained. Vocabulary definitions, a resource list of California Teacher Education Computer Centers (TECC) and publications for students and teachers, and a five-item bibliography are included. (LMM)

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Teacher to Teacher

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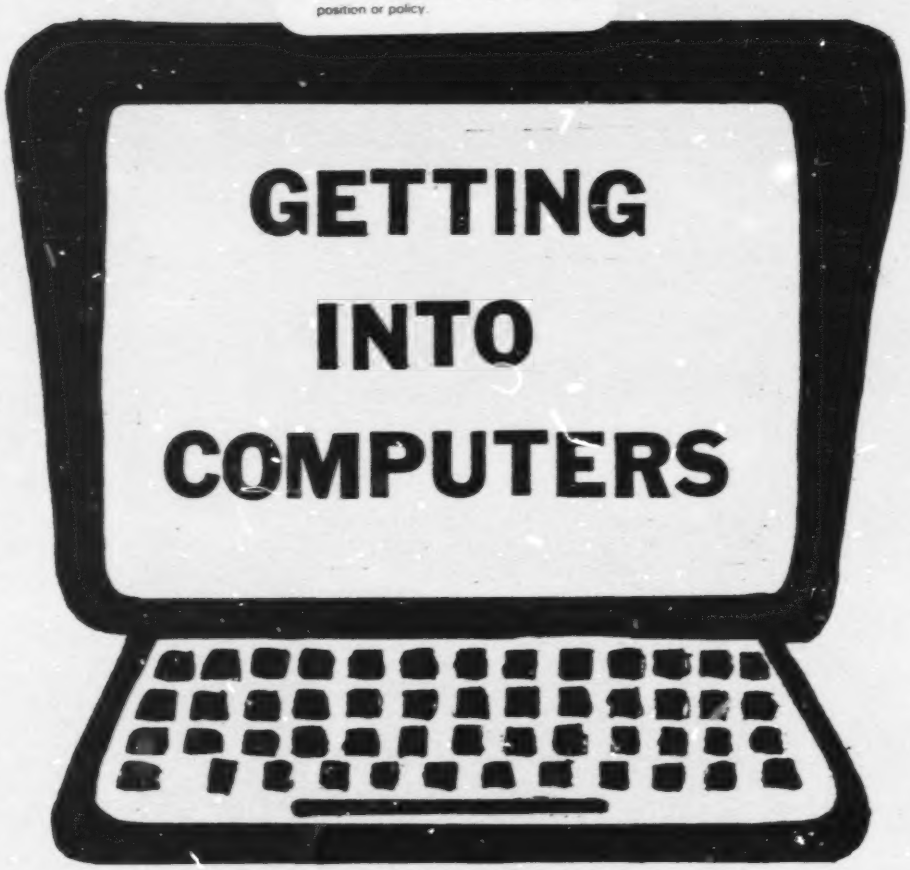

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CALIFORNIA DEMONSTRATION PROGRAM
IN READING
SANTA FE MIDDLE SCHOOL, MONROVIA

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INTRODUCTION

The Computer Age is definitely upon us and is obviously here to stay. However, it is changing daily and the purpose of this booklet is merely to provide a beginning for those educators interested in computers. There is no way we can keep up with the ever-changing computer industry, but a basic knowledge of computers and how they can be used in education is vital for us all.

The most important thing to decide, if you are getting involved with computers for the first time, is what you intend for them to do. For example, Grayson Wheatley, a prominent mathematics educator, wrote an article for "The Arithmetic Teacher " (December, 1980), in which he pointed out that approximately two years of a student's math education from grades one through nine is spent on developing paper and pencil long division. He recommended that we drop the teaching of long division and give students calculators. The time thus saved could be better used for other tasks such as problem solving. In what similar ways can the computer save us time for more thinking type activities? Deciding what you want to gain from a computer will help you choose the best programs and the model which will serve YOUR need.

What justification do we have for purchasing a computer? Professor James Keelik and his colleagues at the University of Michigan have completed their analysis of fifty-one separate research studies on students using computers in secondary schools (sixth grade and above). Computer Assisted Instruction (CAI) improved test scores on objective tests, improved retention and speed at which learning took place (Electronic Learning, January, 1981).

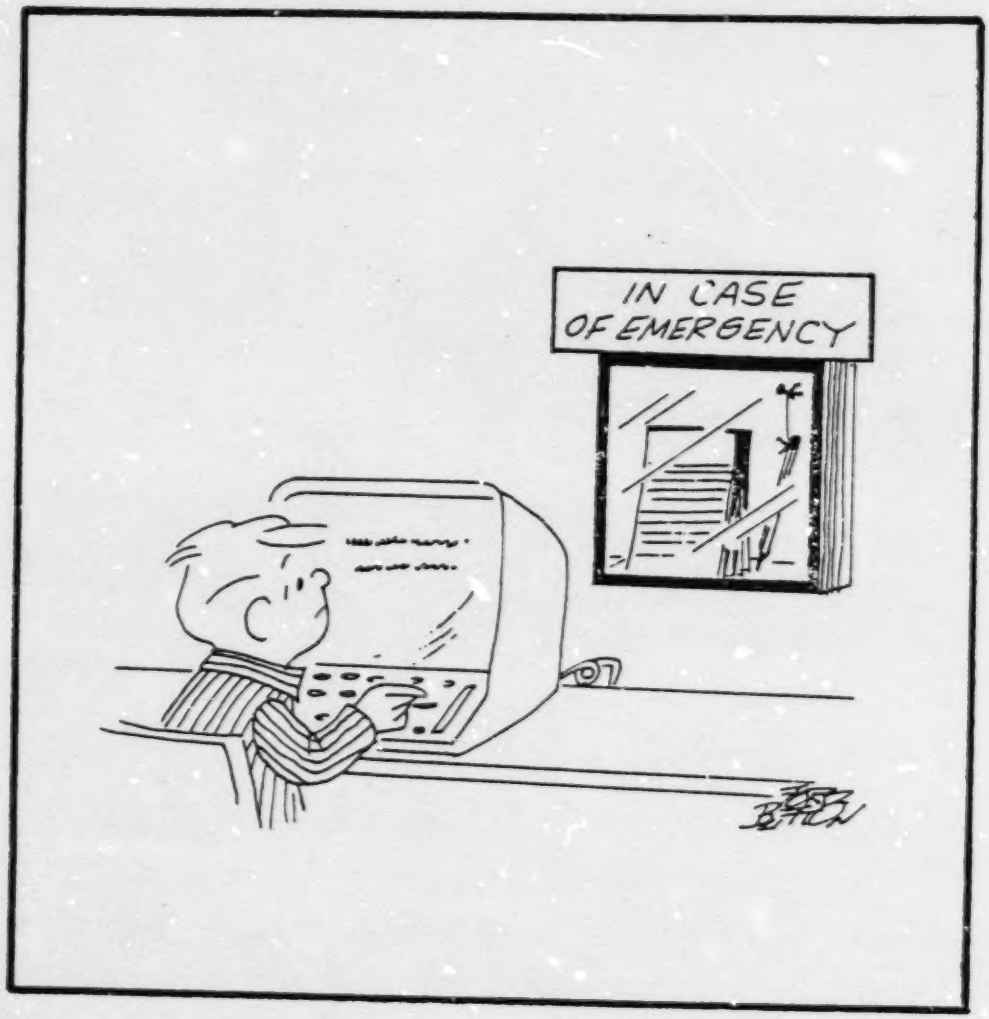
The Educational Testing Service in collaboration with the Los Angeles Unified School District did a four-year study using students in grades one through six and found that (1)CAI was an effective learning aid over the long term (at least one year) as well as the short term; and (2)it was shown that CAI was easily replicable.

Other, less scientific research, consistently is finding that students feel more positive about themselves and school after exposure to a computer. Teachers are reporting almost a complete lack of discipline problems along with increased attendance and punctuality. Teachers are also reporting a unique peer interaction with a more cooperative and collaborative environment.

As educators we need to realize that the new technology is not to be feared and not to be dismissed. It should be used to help those of us who care about teaching to improve the effectiveness of what we do.

It is our hope that the following pages will help to clarify your thinking and save you from making expensive and frustrating mistakes with your computer purchases and curriculum planning.

PLANNING FOR A COMPUTER



1

STEPS TO TAKE (See Model, Page 4)

1. Set up a task force committee of people who are to be involved in the selection and use of the computer. Often industry in your community will help with knowledge and funds if approached.

2. Ask the group to draw up a detailed list of how they intend to use the computer. Include both the present and future plans. Spell out exactly what is wanted: "The computer will be used in remedial reading, grades four through six and should provide both upper and lower case letters, graphic capabilities and color possibilities." The more detailed your objectives the more likely you'll be to find the computer best suited to your needs. You may also find that you need two or more different machines, each with its own specific purposes. See "Understanding the Factors," page 6.

3. Review your existing curriculum and plan a computer literacy program. See the sample on page 17.

4. Review existing computer software. (The Los Angeles County Schools Office offers this service.) See "Selecting Software," page 9.

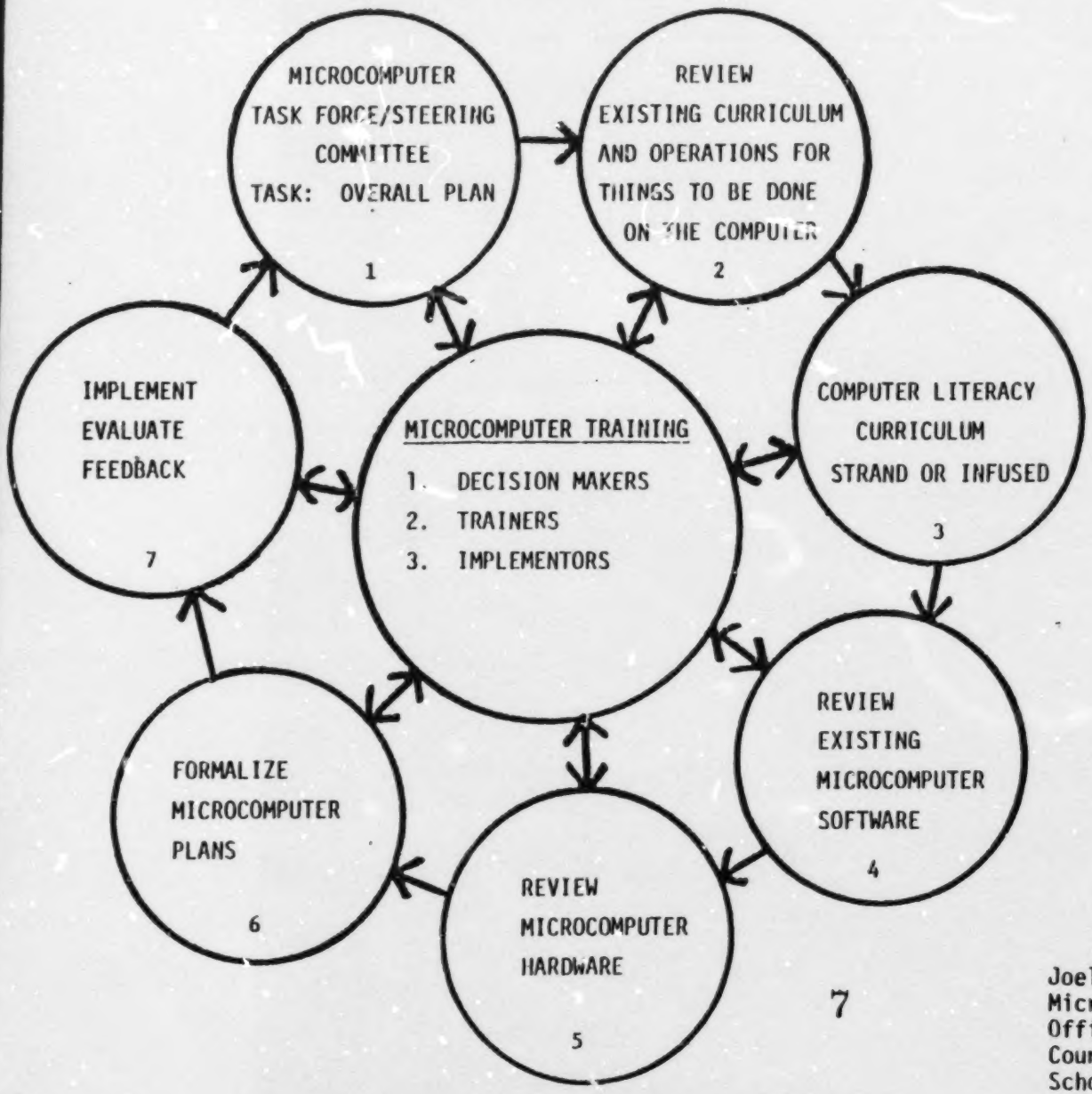
5. Get some first-hand experience with computers; request demonstrations; visit computer-using schools; talk with experts. Visit your local computer dealers and take along the Factor Weight Chart, page 7, to be sure that you ask the questions which are important to your needs. You can then rate the machines. See "Microcomputer Evaluation," page 7.

6. Formalize your plans with the task force committee. How many computers should you order? Decide upon the maximum number which you can afford. Studies have shown that three students can learn at once from a single computer but practical experience suggests that two students is the optimum number to use a computer at one time.

7. Implement the computers.

8. Evaluate and give feedback periodically to the task force.

MICROCOMPUTER INFUSION MODEL



Joel Shawn, Consultant
Microcomputer Services
Office of the Los Angeles
County Superintendent of
Schools

RATING THE MICRO-COMPUTERS: WHAT EXPERTS HAVE TO SAY

HOW DO FIVE of the most popular microcomputers for educational use stack up? To find out, we asked a group of educational computing practitioners to rate the five machines—the Apple II Plus, the Atari 800, Commodore's PET, Radio Shack's TRS-80, and Texas Instruments' 99/4A. (While there are many other microcomputers educators might want to consider when making a purchasing decision, these micros were selected for evaluation because they are currently the most widely used micros in elementary and secondary schools today, and because of the availability of educational software for these machines.)

The evaluators were given a list of 11 factors to consider. They were then asked to give each machine a rating of from one to three stars for each of the factors (one being the lowest; three, the highest). Finally, the average of their ratings for each factor was computed.

So how did the micros stack up? Take a look at the chart below. It can serve as a reference guide as you begin to learn about and evaluate different microcomputers on your own—based on your own individual needs and objectives.

(Editor's Note: The evaluators included *EL* advisers Karen Billings, Gary Bitter, Art Leuhrmann, and Jim Poirot; Steve Berry, Software Acquisition Editor, John Wiley & Sons; Karl Zinn, University of Michigan; Ludwig Braun, State University of New York; software developers Carol Klitzner, Computer Software Solutions, and Dennis Sullivan, Children's Television Workshop; and five staff members of the Microcomputer Resource Center, Teachers College, Columbia University, who teach each day with all of the equipment evaluated.)

	APPLE II PLUS	PET	ATARI 800	TI 99/4A	RADIO SHACK MODEL III
COST	•½	•••	••	••½	••
MEMORY (Range)	•••	••	••½	••	••
SOFTWARE (Availability)	•••	••	•	•	•••
PERIPHERALS	•••	••	••	•½	••½
GRAPHICS	••	••	•••	•••	•
SCREEN DISPLAY	••	••	••	••	••½
KEYBOARD	••	••½	••½	••	••
SOUND/MUSIC	••	•	•••	•••	•
COLOR	••		•••	•••	
SYSTEM EXPANSION	••½	•½	••	••	••
PROGRAMMING LANGUAGES	•••	••	••	••	••

Key:* • = *Fair* •• = *Good* ••• = *Excellent
No Stars = capability doesn't exist

"Electronic Learning," January/February, 1981

UNDERSTANDING THE FACTORS

1. COST

OPTIONS: FROM AS LITTLE AS A few hundred dollars to a few thousand. Typically, the list price includes the keyboard, microprocessor, and the minimum available Random Access Memory (RAM). A monitor may or may not be included.

NOTE: When comparing costs of various machines, remember to be sure to compare machines with similar configurations and capabilities.

2. MEMORY

OPTIONS: MEMORY FOR VARIOUS microcomputers can range from a low of 1K (roughly 1000 characters of information) to 256K. Most commonly, however, memory ranges from 16K to 48K.

REASONS TO CONSIDER: GENERally, the more memory the better. A larger amount of memory is important:

- To run or write large and sophisticated programs
- For word processing
- To accommodate certain peripherals, such as disk drives or printers

3. SOFTWARE

OPTIONS: SOFTWARE IS AVAILABLE to suit a variety of educational needs. However, there are wide variations in its quality as well as in its availability for a particular machine.

REASONS TO CONSIDER: TO USE the computer as a tool for:

- Instruction at all levels
- Record-keeping
- Word-processing

4. PERIPHERALS

OPTIONS: PRINTERS, DISK DRIVES, joy sticks, light pens, paddles, modems

REASONS TO CONSIDER:

- **Printers:** To make paper copies of program listings, records, or manuscripts; useful for most educational applications
- **Disk Drives:** For large storage capacity and speed for loading and saving information; preferable for extensive programming, word processing, administrative tasks
- **Light Pens, Joy Sticks, Game Paddles:** For users to interact with the computer without using a keyboard; useful for young students
- **Modem:** To communicate with other computers over the phone lines

5. GRAPHICS

OPTIONS: THE GREATER THE NUMber of dots or blocks on the screen that can be used to display a graphic, the higher the resolution (quality of detail).

REASONS TO CONSIDER:

- To explain a concept
- To illustrate an idea
- To use as a creative tool for art and programming students
- For administrative purposes
- To enhance a program's appeal

6. SCREEN DISPLAY

OPTIONS: LINE WIDTH RANGES from 20 to 80 characters; line length ranges from 16 to 32 lines; lower case letters are not an option on all micros.

REASONS TO CONSIDER:

- For word processing
- For maximum flexibility in formatting text on the screen
- For displaying upper and lower case letters in language arts instruction

7. KEYBOARD

OPTIONS: (1) A TYPEWRITER-LIKE unit with keys you depress; (2) A flat (membrane) unit with keys drawn on a smooth surface that you touch

REASONS TO CONSIDER:

- Flat Keyboard—For young children
- Standard Keyboard—To use the computer as a typing tutor, word processor, or for programming

OTHER CONSIDERATIONS:

- Function Keys ("Return/Enter"; "Erase/Back Space"): Are they large, recognizable and easily found?
- Number Keypad: Handy for a lot of calculating activities

8. SOUND/MUSIC

OPTIONS: SOME MICROS DO NOT have sound/music capability; others have it built in; still others can be made to produce sound at an additional cost

REASONS TO CONSIDER:

- To reinforce, focus, or prompt students
- For computer-assisted music instruction

9. COLOR

OPTIONS: MACHINES CAPABLE OF color display offer from four to sixteen different colors

REASONS TO CONSIDER:

- For highlighting, contrasting, or possibly increasing the appeal of a program
- For art students

10. SYSTEM EXPANSION

REASONS TO CONSIDER:

- To connect a series of micros together with a disk-sharing system
- To subscribe to an information network, such as CompuServe or The Source
- To turn your micro into a terminal to communicate with other micros, a mini, or main frame
- For interactive videotape or videodisc connections

11. LANGUAGES

REASONS TO CONSIDER:

- BASIC: Most common microcomputer language; useful for general purpose programming
- FORTRAN or COBOL: For business or computer science students, or for creating some administrative programs
- PASCAL: Useful for more sophisticated programming by computer science students
- AUTHORING LANGUAGES: For non-programming teachers who want to write their own programs
- LOGO: Particularly good for young children; highly interactive and instantly useable.

NOTE: ALL BASICs ARE NOT THE same. If your plans include programming, compare the various BASICs available to find the one that you prefer.

12. SERVICE

OPTIONS: WHILE MOST MANUFACturers offer a 90-day parts and labor warranty, there are variations in service plans to be arranged with your local dealer. For some practical tips on how to select a dealer, see LeRoy Finkel's article on page 26 of this issue.

FACTOR WEIGHT CHART

DIRECTIONS: The chart (right) lists the 12 factors that educators are most often concerned with when selecting a microcomputer. Read down the list of factors, and for each one you want to weight, circle the number which best expresses how important that factor is in terms of your goals. (Follow the same procedure for any other factors you want to add to the list)

	NOT IMPORTANT	SOMEWHAT IMPORTANT	IMPORTANT	VERY IMPORTANT	EXTREMELY IMPORTANT
COST	1	2	3	4	5
MEMORY	1	2	3	4	5
SOFTWARE	1	2	3	4	5
PERIPHERALS	1	2	3	4	5
GRAPHICS	1	2	3	4	5
SCREEN DISPLAY	1	2	3	4	5
KEYBOARD	1	2	3	4	5
SOUND/MUSIC	1	2	3	4	5
COLOR	1	2	3	4	5
SYSTEM EXPANSION	1	2	3	4	5
PROGRAMMING LANGUAGES	1	2	3	4	5
SERVICE/WARRANTY	1	2	3	4	5

MICROCOMPUTER EVALUATION

DIRECTIONS: To find out which microcomputers seem best suited for your particular applications and objectives, follow the steps listed below.

1. Write the names of the microcomputers you want to evaluate across the top of this form.
2. For each factor that you've assigned a weight to, write the weight (1-5) in the blank labelled FW (Factor Weight). Be sure to write each factor weight under each machine being evaluated.
3. Now, rate each machine according to how well it supports each of the factors being considered. Use this rating system: 1 = Poor; 2 = Fair; 3 = Good; 4 = very good; 5 = Excellent. (For example, if color is a factor that you've rated 5, and the micro you are considering does not have color capability, you might give that micro a "1" for Color. If, on the other hand, the Keyboard is another factor you consider important, and that micro has exactly the kind of keyboard you want, you might give that machine a "5" for that factor.) Write your rating of factors for each micro in the blank labelled MR (Micro Rating).
4. Multiply your FW by your MR and write the product in the space to the right of the equals sign.
5. Add up your list of products and write the sum in the space marked Grand Total. The micro with the highest Grand Total could just be the one that's right for you!

	MICRO____	MICRO____	MICRO____	MICRO____	MICRO____
COST	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR
MEMORY	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR
SOFTWARE	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR
PERIPHERALS	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR
GRAPHICS	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR
SCREEN DISPLAY	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR
KEYBOARD	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR
SOUND/MUSIC	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR
COLOR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR
SYSTEM EXPANSION	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR
PROGRAMMING LANG.	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR
SERVICE/WARRANTY	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR	___ × ___ = ___ FW MR
GRAND TOTAL	___	___	___	___	___

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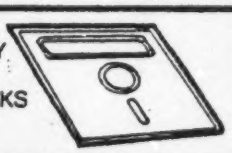
How Much Will It Cost?

Here's what you pay to get three different levels of performance			
	YOU PAY:		
	UNDER $800	**$1,000 to $3,000**	**$5,000 to $10,000**
WHAT IT DOES	• GAMES • LEARNING PROGRAMS • SIMPLE FILES & LISTS • SIMPLE PROGRAMMING	• WORD PROCESSING • FILES • INCOME TAXES • BUDGETING • INVESTMENT CHARTS • PROGRAMMING	• WORD PROCESSING (print-quality) • BUSINESS ACCOUNTING • INVENTORY CONTROL • FILES • DATA RETRIEVAL
BASIC EQUIPMENT	• YOUR OWN TV SET • SIMPLE KEYBOARD • JOYSTICKS (for games) 	• TYPEWRITER-TYPE KEYBOARD • MONITOR (color or b&w) • DOT-MATRIX PRINTER (for word processing) • DISK DRIVE (for more capability) 	• EXTENSIVE KEYBOARD • MONITOR (color or b&w) • LETTER-QUALITY PRINTER • BIGGER DISK DRIVE • MODEM (to connect to telephone)
INTERNAL MEMORY (or storage capacity)	16K to 64K (3,000 to 13,000 words)	64K to 128K (13,000 to 26,000 words)	64K to 1M (13,000 to 210,000 words)
CENTRAL PROCESSING UNIT	8-bit	8- or 16-bit	16-bit (can perform more than 1 function at a time)
ADDITIONAL STORAGE & PROGRAMS	CASSETTES 	5¼" FLOPPY DISKS 	8" FLOPPY DISKS & HARD DISKS 
SOME BRANDS	Atari 600XL Commodore 64 Timex IBM-PCjr	Apple IIe Atari 800XL Franklin Ace Sanyo TRS-80 model 4	Apple LISA IBM-PC Kaypro II Victor Xerox Zenith

WOMAN'S DAY 2/7/84

11

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SELECTING SOFTWARE

"I made it through mainstreaming, busing, teacher burnout, and state and local cutbacks. Just when things looked brighter, along comes 'The Software Search.' "

SELECTING SOFTWARE

Software is step-by-step instruction that causes the computer hardware to carry out its function.

Be aware that good educational software is often developed by a team. The team may include a teacher, a learning theorist, a graphic artist and a programmer. Be aware also that writing good quality computerized materials is a major task. It is more difficult than writing a manuscript. We as full-time teachers do not normally have the time to pursue such a task.

Until the staff is familiar with your computer, get copies of public domain tapes and disks. Much of the current software is unimaginative, so keep your software store small and feature quality. There are several types of educational software available:

1. Drill and Practice
2. Tutorials
3. Simulations
4. Games
5. Management Systems

Drill and practice: Computer assisted instruction that provides the user with practice in applying some principle or technique previously learned. This is best for remediation and make-up work. It can be compared to flash cards, workbooks and assignment sheets. Permits students to work at own rate.

Tutorials: Presents new information, permits students to progress at their own rates. The style and format of tutorials is much more critical than with drill and practice because the material is new to the students.

Simulations: This is a useful tool for encouraging thinking skills. It is an imaginary environmental situation which confronts the student with problem solving. The student interacts with the computer to resolve the problem. The computer generates the consequences of the student's actions in the form of some appropriate feedback.

Games: Well designed and creative computer games merit serious attention. They provide genuine opportunities for skill development and fall in to four major categories:

1. Skill and action: require physical dexterity, eye-hand coordination and quick response.
2. Adventure: calls on players to use logic to reach a specific goal such as hidden treasure.
3. Fantasy: asks players to role-play supernatural characters and apply their unusual powers in fanciful situations.
4. Strategy: requires thought and analysis and ranges from checkers and chess to very complex simulations.

Students love the game approach to learning. Tic-tac-toe Spelling, Hangman, Matching and other games can be useful to reinforce spelling and vocabulary on the computer. Many of these programs now allow the teacher to quickly program in a list of words pertinent to their curriculum. See page 14.

Management Systems: Computers can now keep attendance, grades and test results.

A final note: make a back-up disk or tape of your commercial programs in case the original is damaged. Many companies provide back-up disks; check when you are ordering.

If you are able to purchase a cassette and a disk drive, both are useful. The cassette makes it cheaper for students to copy their own programs but the disk is MUCH faster to load and much more convenient when the time factor is a problem. Again, we strongly recommend a disk drive which has a light to signal when it is on, as it can be damaged if left on too long.

CARE AND MAINTENANCE

The advantage of the cassette unit is that it needs little care except for periodic cleaning of the magnetic "heads." You can use cotton swabs and tape head cleaner. Alcohol may be used in an emergency, but it is not recommended for long term use.

The cassette tapes should be rewound to the beginning after use as this protects the recording from abrasion and contamination. Do not store or place tapes near strong magnetic fields such as loudspeakers or large motors.

The computer may be left on without damage much as you leave a light burning. Our PETS get warm by the last period of the day and often develop strange "bugs" in the programs so we now rest our PETS at lunchtime.

The disk drive SHOULD NOT be left on and will be damaged if you do so. For this reason, we recommend purchasing one that has an indicator light to signal that it is operating. We routinely load a program from the disk into the computer, remove the disk and turn off the disk drive. Remember, the disk drive is a peripheral of the computer and, therefore, must be turned on AFTER the computer and turned off BEFORE the computer is turned off.

Disks or diskettes are easily damaged and should be kept in their storage envelopes when not being used. Keep them away from any magnetic field as exposure can distort data. Do NOT place on top of the computer or the disk drive. Do NOT expose them to heat or sunlight. Do NOT touch or attempt to clean disk surface. Before applying power or turning off the disk drive, open the door and be sure the disk has been removed. DO make a "back-up" copy in case the disk is inadvertently damaged.

COMMODORE PET SOFTWARE TIPS

1. Order software that allows you to easily program in your own materials, such as:

GENESIS (teachers may develop their own CAI with questions, answers, and instructions without knowledge of programming.)	Greenwood Software 1214 Washington The Dalles, Oregon 97058 (503) 298-1114
MATCH GAME (Program in your own words)	Teaching Tools P.O. Box 50065 Palo Alto CA 94303 (415) 493-3477
SPELL-N-TIME (Program in your own words)	Courseware Magazine 1341 Bulldog Lane, Suite C Fresno CA 93710 (209) 227-4341
TIC TAC TOE SPELL - C (Program in your own words)	JMH Software of Minnesota, Inc. 4850 Wellington Lane Minneapolis MN 55442

2. Typing skills can be extremely useful:

TYPE RIGHT	Barron Enterprises 714 Willow Glen Rd. Santa Barbara CA 93105

3. Simulations:

PONY EXPRESS LOG	Computa-Mania 18285 Highway 108, Suite 5 Jamestown CA 95327
CHRISTOPHER COLUMBUS	Computa-Mania

4. Word Processing:

PAPERMATE (60 Command)	AB Computers Colmar PA 18915

5. Commodore Authorized Dealer — United Education and Software
3600 S. Minnesota
Sioux Falls, South Dakota 57105
(800) 843-9970
Contact: Bruce Jenks

SAMPLE EDUCATION SOFTWARE EVALUATION

1. Different types of software:

   A. Computer Assisted Instruction (CAI)

   B. Management Assisted Instruction (MAI)

   C. Computer Managed Instruction (CMI)

2. Basic Components to look for in a "good" software package:

   A. Content focus (WHAT)

   B. Educational purpose (WHY IT DOES IT)

   C. Instructional quality (HOW IT DOES IT)

   D. Technical quality (HOW IT DOES IT)

   E. Recommendations (IS IT WORTH BUYING)

SAMPLE COMPUTER PLAN FROM MONROVIA UNIFIED SCHOOL DISTRICT

"Join me in welcoming our new staff members. Mr. Simpson, art. Ms. Dawes, science. Mr. Silbert, computer repairman."

COMPUTER CURRICULUM PLAN

Computer Literacy - what does it mean?

Initially, Computer Literacy meant a level of understanding which enabled students to talk about computers but which involved little or no experience in working with computers. This is now called computer awareness.

CAL (Computer Assisted Learning) added a new dimension. The computer could teach the student. When a computer acts upon a student in a computer assisted learning mode, the student need not learn much about computers. But when a students acts upon a computer, developing programs and solving a variety of problems, more knowledge of computers is required - on both the part of the student and the teacher.

It might be feasible to have students in a Language Arts class practicing reading and language skills on a computer while they learn basic programming skills in their math class. The math teacher would then need to be knowledgeable in programming while the Language Arts teacher would not.

The following is the initial planning by a computer committee in the Monrovia Unified School District which may help you start such a plan in your district.

COMPUTER INSTRUCTION GOALS - MONROVIA UNIFIED SCHOOL DISTRICT

The goal of computer education is to provide the skills, knowledge and values that allow a person to function comfortably as a productive citizen in a computer oriented society.

A basic curriculum shall be provided for pupils at the elementary level. It shall be intensified at the middle school level with mastery achieved at the secondary level.

The hardware shall be selected which provides durability, flexibility and available maintenance.

The purchase and circulation of software shall be coordinated through the district to provide a broad range of instructional opportunities and to avoid unnecessary duplication.

Staff development will be coordinated for all employees who will be providing instruction to pupils or utilizing computers within their area of responsibility.

DEFINITION OF COMPUTER AWARENESS/LITERACY
MONROVIA UNIFIED SCHOOL DISTRICT

ELEMENTARY SCHOOL

Computer Literacy for the elementary age pupil shall be:

1. Opportunity to experiment on computer
2. Simple knowledge of how to make a computer do what you want it to do
3. Knowledge of simple basic vocabulary

MIDDLE SCHOOL

Computer literacy for the middle school pupil shall be:

1. Understanding of how basic computer works
2. Experience in programs related to subject matter
3. Knowledge of how to operate computer
4. Opportunity to use computer in library
5. Mastery of basic vocabulary

HIGH SCHOOL

Computer literacy for the 9th grader shall be:

1. Introduction of vocabulary
2. Knowledge of basic functions and operation of computer
3. Understanding of how the computer works (may be done effectively through the use of media).
4. Experience on a minimum of four programs in subject areas as math, language arts, science
5. Mastery of necessary vocabulary

HIGH SCHOOL VOCATIONAL PROGRAMS

Computer literacy in vocational areas shall include using the computer to do vocational tasks. It will require:

1. Knowledge of how computer works
2. Knowledge of language specific to a subject area
3. Practice in using the computer in a specific vocational area

ONE COMPUTER - THIRTY STUDENTS

"Yes, I'll tell you what could replace this wonderful education I'm receiving: a silicon chip!"

ONE COMPUTER - THIRTY STUDENTS

This is obviously not the ideal situation but one in which many schools are finding themselves. In this case, you might put the computer and all peripherals (disk, tape, etc.) on a desk-high cart which can be moved from room to room much as your movie projector is now. Be sure all instructions are attached (laminated, if possible) to the cart and there is one "key operator" person on campus who can be called upon to help if problems arise. All teachers should have in-service on care and handling of the computer.

Students can practice typing skills on a cardboard "keyboard" in preparation for use of the computer. This works well in elementary school. Students can also use books featuring computer literacy and practice on paper before going to the computer. Random House publishes **Spotlight on Computer Literacy**, which is good in this respect. They also have books written for practicing on a particular model of computer which allows the student to do writing activities prior to using the computer.

One teacher allowed the one computer in the classroom to be checked out to parents on the weekend, asking that they sign a voucher that it be returned on Monday morning in the same condition as it left on Friday. This proved very successful in her situation.

A teacher in Boulder, Colorado, has three computers and has divided them into three categories. The first is for beginners and users sign up for twenty minute slots per week. The second is reserved for programming and the third for teachers or students assigned to a special project. (Electronic Learning, October, 1982.)

A helpful booklet, **Computers In My Curriculum?**, contains eighteen lesson plans for teaching computer awareness without a computer. See Teacher Resources, page 37.

The Activity Day Coupon on page 25 is a method by which we reward good workers by allowing free time on the computer. You could easily type up your own rules, paste them over ours, copy it and use it in your classroom.

Another idea to help your students learn the concept of computers is given in the magazine, "Classroom Computer Learning," January, 1984, (pp. 64-65) by Andy Van Duyne.

THE HUMAN COMPUTER
By Andy Van Duyne

Many teachers are experiencing the difficulty of teaching computer programming with only a limited number of computers -- and a limited amount of computer time -- is available. This problem can be alleviated by supplementing the use of the computing machine with a role-playing activity called "The Human Computer," which is designed to illustrate programming techniques and terms. (Described here are ways to use the Human Computer to teach about BASIC programming.)

You will need a few small, empty boxes or other containers; some slips of paper and pencil; a chalkboard and eraser; a long table, or desks arranged in a row to provide a linear seating arrangement for a number of people; and a small table or desk labelled "Memory."

One person plays the role of each program line and performs whatever function is assigned to that line. For example, write on the chalkboard:

```
10 LET X=7
20 PRINT X
```

Three people are required. The first is seated behind the table and assigned to be line 10. The second, seated next to the first, acts as line 20. The third, who remains mobile on the opposite side of the table is called "Program."

When you say, "RUN," "Program" goes to "Line 10." This student writes the letter X on a box, writes the number 7 on a slip of paper and puts it in the box, and hands the box to "Program." "Program" then puts the box on the desk labeled "Memory."

Next, "Program" delivers the box to "Line 20," who looks in the box, writes on the board the number that is on the slip of paper in the box, and returns the box to "Program." "Program" then returns the box to "Memory."

After trying a few variations, add another line (and another person): 30 GOTO 20. The activity proceeds as before, but instead of stopping after returning the box to "Memory" after line 20, "Program" moves to "Line 30," who instructs "Program" to "Go to 20." "Line 20" then repeats his function. You might want to allow this loop to continue several times, and then say, "BREAK," "RESET" OR "RUN/STOP."

The following examples can be integrated into short programs and acted out by students:

***Arithmetic Operations.** LET X=X + 1 changes the number in the X box to 1 more than it was. LET X=X-1 changes X to 1 less than it was. LET X=X*2 takes the number in X, multiplies it by 2 and writes the product on the paper in the box. LET X=X/2 tells the student to take the number in the box, divide it by 2, and write the quotient on the slip in the box.

***IF/THEN Statements.** "IF X=4" looks at the number in the box. If it is not 4, the box is handed back to "Program," who returns the box to "Memory" and moves to the next line. If the number is 4, the line does whatever comes next. For example, IF X=4 THEN STOP instructs the student that the activity is over. IF X=4 THEN X=0 tells the student to replace the number 4 with 0 and hand the box back to "Program." IF X=4 THEN GOTO 10 instructs the student to hand the box back to "Program" and say, "Go to 10."

***INPUT Statements.** INPUT Q instructs "Program" to retrieve the Q box. If no Q box exists, the line gets a box and marks it Q. The line then instructs "Program" to take the box to someone named "Keyboard," who is seated away from the table. "Keyboard" puts a number in the box and returns it to "Program," who then puts the box in "Memory."

REM Statements. REM THIS PROGRAM DOES ARITHMETIC instructs the student to say, "This program does arithmetic" or whatever the remark is.

A few points to remember: Always have "Program" return the boxes to "Memory," rather than wander about with them. Also, run whatever programs you develop with the Human Computer on a real computer as soon as possible, If you have a computer available all the time, keep it up and running in tandem with the human demonstration.

You may find that after using the Human Computer, your students can conceptualize more difficult BASIC statements. Even when they no longer use the Human Computer, what they learned through role-playing will help them understand new computer problems they encounter.

(Mr. Van Duyne is a teacher at Norwood Elementary School in Norwood, N.Y.)

ACTIVITY DAY COUPON:

RULES:

. You must be eligible!
. This must be used between _____ _____and _____(dates)
. You may play any game or use any program we have on the computer.
. You may play a game with an eligible friend.
. You may substitute each of these free days for any assignment on your contract and receive an automatic grade of A (limit 2 per contract).
. You may choose to do programming or printing on the computer.
. You may choose reading with an eligible partner, free reading or any special activity approved by your teacher.

STUDENT _____

Date:

Activity:

ACTIVITY DAY COUPON:

RULES:

. You must be eligible!
. This must be used between _____ _____and _____(dates)
. You may play any game or use any program we have on the computer.
. You may play a game with an eligible friend.
. You may substitute each of these free days for any assignment on your contract and receive an automatic grade of A (limit 2 per contract).
. You may choose to do programming or printing on the computer.
. You may choose reading with an eligible partner, free reading or any special activity approved by your teacher.

STUDENT _____

Date:

Activity:

WORD PROCESSING

"Let's see, you've got your calculator, word processor, personal computer, VTR disc, electric typewriter, cassette recorder, and spare batteries. Have a good day at school."

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WORD PROCESSING

If your goal is to improve your students' Language Arts skills, then a printer is a valuable tool. It is run with a disk drive and the prices vary. We use the Commodore CBM tractor printer which cost approximately $500.

This is a sample of a dot matrix tractor printer. It has an 80 column capacity and can print three copies. It employs a tractor feed mechanism that involves the use of sprocket holes in the paper edges.

This is a sample of the typeface of a Smith-Corona TP-I letter quality printer. It is more expensive than a dot matrix printer but is more appropriate for formal correspondence.

Inexpensive word processing disks can be purchased. Scholastic's "Bank Street Printer" for grades four through twelve is popular and available for IBM-PC, Apple, Atari and Commodore 64.

We have Commodore PET computers and use a simple program, "PaperMate" by AB Computers. With this program our students are able to produce a class newspaper using editing commands which center titles, print designated left and right justified margins and their articles can be saved on a disk if not completed during a class period.

Students learning English can benefit by writing with a printer and students who are programming can list their programs on the computer and then run off a copy on the printer for future use.

One suggestion for elementary schools where typing skills are a problem is for the teacher to sit at the computer while the class gives her input for a group story. They can observe the changes being made, learn the capabilities of word processing and they take pride in the clean finished copy of the class story.

Another instructive and entertaining activity was having our students do a "group" story. Each student created a short setting for a story on one computer, then they all moved to a different computer and added a protagonist to the setting already on screen there. They then moved to a third computer and added an antagonist, to a fourth to add a conflict and finally to a fifth to create a conclusion. Students loved this writing activity and after it was printed, happily critiqued their finished product.

The computer gives remarkable teaching opportunities to work directly with students on difficult portions of their writing. The teacher can point out certain writing errors while the student's work is still on the screen. This enables some students to overcome writing obstacles. Students will usually write more because they can create and eliminate words without worrying that a permanent record will be kept of the "trial and error" thinking processes.

VOCABULARY
RESOURCES
BIBLIOGRAPHY

"Remember when hardware meant a hammer and nails?"

VOCABULARY

ASC II Code	American standard code for information interchange which assigns a unique numerical value between 0 - 128 to every letter of the alphabet.
BASIC	Beginning All-Purpose Symbolic Instruction Code - computer language designed for education but now also used by business.
Bits	Storage cells in a computer's memory.
Bug	A flaw in the design of a computer or computer program.
Bytes	A group of bits. A computer usually deals with groups of eight bits. Eight bits make a byte.
CAI	Computer Assisted Instruction
Central Processing Unit (CPU)	The integrated circuits that form the processing and memory units of the computer.
Cassette Drive	The electronic machine used to read/write material to and from recording tape or cassettes. In order to assess any piece of information, the tape must be advanced (rewound) past all other information. This makes tape storage slower and less efficient than disk storage. However, it is less expensive and easy for students to operate.
Character	Any letter, digit, punctuation mark or symbol that a programmer handles when processing data.
Chip	A silicone square, as small as 1/64 of an inch on a side, which contains electrical circuitry.
COBOL	Common Business Oriented Language - computer language used mainly in business.
Command	Any order the computer carries out immediately.
Cursor	A lighted or blinking symbol that is always on a computer screen marking the next spot where a message will be printed or a symbol appear if a key is pressed on the keyboard.
Data	Information
Disk Drive	The electronic machine used to read/write material to and from a diskette.
Disk, Diskette or Floppy Disk	A disk similar in appearance to a 45 RPM record which contains the programmed material.
End	BASIC command that tells the system that the instructions are complete.

FORTRAN	Formula Translation - computer language used mainly in math and science.
Hardware	Computer equipment on which progrms are used.
Input	Make data available to computer.
LIST	BASIC command to make the computer display a program which is usually identified by a code name.
LOGO	A "high-level" computer language that helps students write their own programs. One of LOGO's features is a "turtle" that you can "teach" to draw circles and other shapes.
Memory	Storing or recalling instructions and data to use again.
Menu	The list of choices your computer shows you before you start to work.
Microcomputer	A home (personal) or desktop computer.
Microprocessor	A central processing unit used for word processing.
MODEM	Modulator-demodulator: a device that changes computer code into signals that can travel over a telephone wire and vice versa. You need a MODEM if you want your computer to "phone" another computer.
Output	Present results in a usable form.
Peripheral	Any device connected with and controlled by the central computer, such as a printer.
Printout	Output from the computer when it is typed on paper.
Processing	Performing arithmetic operations; rearranging or testing data.
Program	Instructions that tell a computer how to work.
Programmer	A person who give instructions to a computer.
RUN	A BASIC command that orders the computer to process the instructions on the program.
Software	The programs used on a computer either stored on magnetic tape or diskette.
SYNTAX ERROR	Computer response to a mistake in the way a command is given or spelled.
Word Processor	A device using a microprocessor in creating, editing, storing retrieving and printing. Microcomputers can function as word processors with appropriate software, but are not as efficient at these text-editing tasks as true word processors.

RESOURCES

Fifteen Teacher Education and Computer Centers, established in the 1982-83 Budget Act and codified in SB 813/1983, are charged with providing staff development services to teachers and administrators on a regional basis. The TECCs provide services in math , science, technology, and other curricular/instructional areas.

TEC Center services are in high demand and are often oversubscribed. Their service priorities are limited both by legislated mandate and policy board decisions to maintain high quality services. Thus, we need to keep reasonable expectations of what they can offer. Nevertheless, networking is a key element in creating a staff development system. If you have a request, product, or service to share, contact your regional TEC Center Director and help build the network of quality staff development services in California.

TECC SOFTWARE LIBRARY
AND CLEARINGHOUSE
Ann Lathrop, Library Coordinator
SMERC Library and Microcumputer Center
San Mateo County Office of Education
333 Main St.
Redwood City CA 94063
(415) 363-5472

REGION 1
Jan Coates, Director
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Humboldt County Office of Education
901 Myrtle
Eureka CA 95501
(707) 445-5411, ext. 264

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Tehama County Office of Education
1135 Lincoln St.
P.O. Box 810
Red Bluff CA 96080
(916) 5275811

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Marin County Office of Education
1111 Las Gallinas Ave.
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San Rafael CA 94913
(415) 499-5877

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9738 Lincoln Village Dr.
Sacramento CA 95827
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San Francisco County Office of Education
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801 County Center Three Court
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100 Skyport Dr., MC 237
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Region 15 TEC Center
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Imperial County Office of Education
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El Centro CA 92243
(610) 339-6463

PUBLICATIONS FOR STUDENTS:

Spotlight on Computer Literacy by Ellen Richman
Random House
400 Hahn Rd.
Westminster, MD 21157

PUBLICATIONS FOR TEACHERS:

The A-V Connection: The Guide to Federal Funds for Audiovisual Users ($33)
National Audiovisual Association
3150 Spring St.
Fairfax VA 22031

Classroom Computer Learning Directory of New Education Software ($9.95)
Subscription Department
561 W. Cermak Rd.
Cicero IL 60650

Computers in My Curriculum? ($11)
Solano County Office of Education
655 Washington St.
Fairfield CA 94533

Electronic Learning Magazine
Scholastic, Inc.
2931 E. McCarty St.
P.O. Box 7502
Jefferson City MO 65102

Instructor's Computer Directory For Schools ($19.95)
P.O. Box 6098
Duluth MN 55806-9798

T-E-S-S The Educational Software Edition ($49.95)
Teachers College Press
c/o Harper & Row
Keystone Industrial Park
Scranton PA 18512

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